

## *Retraction*

# **Retracted: Research on Precision Cultivation of Digital Multimedia Crop Based on Predictive Computational Intelligence Technology**

### **Advances in Multimedia**

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

- (1) Discrepancies in scope
- (2) Discrepancies in the description of the research reported
- (3) Discrepancies between the availability of data and the research described
- (4) Inappropriate citations
- (5) Incoherent, meaningless and/or irrelevant content included in the article
- (6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their

agreement or disagreement to this retraction. We have kept a record of any response received.

### **References**

- [1] Y. Lin and Y. Zhang, "Research on Precision Cultivation of Digital Multimedia Crop Based on Predictive Computational Intelligence Technology," *Advances in Multimedia*, vol. 2021, Article ID 2864009, 9 pages, 2021.

## Research Article

# Research on Precision Cultivation of Digital Multimedia Crop Based on Predictive Computational Intelligence Technology

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With the intersection and integration of modern crop cultivation and emerging disciplines, crop cultivation management is moving from traditional modeling and standardization to quantitative and intelligent direction. Crop precision cultivation technology is to apply system science and information technology to crop cultivation and digitally design information perception of the objects and processes involved in crop cultivation, dynamic simulation, so as to realize the quantification and accuracy of crop cultivation management. With the integration and intersection of modern digital multimedia crop cultivation and emerging disciplines, digital multimedia crop cultivation tends to gradually implement the quantitative and intelligent development, replacing the traditional scale and standardization. The technology of digital multimedia crop cultivation is to use science and information technology in digital multimedia crops to achieve the quantitative and precise characteristics of digital multimedia crop cultivation. The advancement of digital multimedia crop cultivation technology has greatly improved the management and benefits of the entire agricultural industry and has played a positive role in the development of agricultural information and modernity.

## 1. Introduction

The high-tech technologies such as information technology and biotechnology are applied in the agricultural industry, which has given a revolutionary breakthrough in digital multimedia crop cultivation technology. The excavation of digital agriculture has brought convenience to the concept and technology of digital multimedia crop cultivation and has brought new technologies and technical information and management services in new directions to the development of digital multimedia crops, making digital multimedia crop production gradually digitized [1–3]. Therefore, the basic concepts, core technologies, and development prospects of digital multimedia crop cultivation need to be understood and mastered in detail, which is conducive to the progress and development of the subject, is more beneficial to the theoretical concepts and technical systems, and increases

the competitiveness and sustainability of digital multimedia crop cultivation, therefore significantly improving the management and benefits of agriculture [4–6].

Digital multimedia cultivation will change with the change of region, season, and technology because of its effect on the environment. The quality of digital multimedia crops can accurately predict the situation of computing intelligence technology, etc., and can perform accurate digital multimedia crop cultivation work under the complex environment in different regions and at different situations in China.

## 2. Predictive Computing Intelligent Technology Algorithm

The predictive computing intelligent technology algorithm variable is a ternary array  $(r_1, r_2, r_3)$   $r_1 < r_2 < r_3$  composed of cleared numbers, and its membership function is

$$\mu(x) = \begin{cases} \frac{x-r_1}{r_2-r_1}, & \text{if } r_1 \leq x \leq r_2, \\ \frac{x-r_3}{r_2-r_3}, & \text{if } r_2 \leq x \leq r_3, \\ 0, & \text{others.} \end{cases} \quad (1)$$

Assuming that the predictive computing intelligence technology algorithm  $\alpha = (a_1, a_2, a_3)$ ,  $\beta = (b_1, b_2, b_3)$ , according to the predictive computing intelligence technology, the expansion principles of addition and scalar multiplication are as follows:

$$\begin{aligned} \mu_{\bar{\alpha}+\bar{\beta}}(z) &= \sup \left\{ \min \left\{ \mu_{\bar{\alpha}}(x), \mu_{\bar{\beta}}(y) \right\} \mid [z = x + y] \right\} \\ &= \begin{cases} \frac{z - (a_1 + b_1)}{(a_2 + b_2) - (a_1 + b_1)}, & a_1 + b_1 \leq z \leq a_2 + b_2, \\ \frac{z - (a_3 + b_3)}{(a_2 + b_2) - (a_3 + b_3)}, & a_2 + b_2 \leq z \leq a_3 + b_3, \\ 0, & \text{others.} \end{cases} \end{aligned} \quad (2)$$

Then,

$$\bar{\alpha} + \bar{\beta} = (a_1 + b_1, a_2 + b_2, a_3 + b_3), \quad (3)$$

This is based on  $\mu_{\lambda\bar{\alpha}}(z) = \sup \{ \mu_{\bar{\alpha}}(x) \mid z = \lambda x \}$ .

Then,

$$\lambda\bar{\alpha} = \begin{cases} (\lambda a_1, \lambda a_2, \lambda a_3), & \lambda \geq 0, \\ (\lambda a_4, \lambda a_3, \lambda a_2), & \lambda < 0. \end{cases} \quad (4)$$

Suppose  $\bar{\alpha}_i = (a_{i1}, a_{i2}, a_{i3})$ ,  $i = 1, 2, \dots, m$ , is the predictive computing intelligent technology algorithm; the resulting nonnegative linear combination and predictive computing intelligent technology algorithm plan of  $\bar{\alpha}_i$  are

$$\sum_{i=1}^m \lambda_i \bar{\alpha}_i, \quad \lambda_i \geq 0, \quad (5)$$

and

$$\sum_{i=1}^m \lambda_i \bar{\alpha}_i = \left( \sum_{i=1}^m \lambda_i a_{i1}, \sum_{i=1}^m \lambda_i a_{i3} \right). \quad (6)$$

The predictive computing intelligent technology algorithm is a kind of stochastic programming, the constraint condition includes random parameters, and the chance represents the probability of the constraint condition being established. Under the environment of predictive computing intelligence technology algorithm, the possibility of taking opportunity as a constraint condition is understood. The random predictive computing intelligent technology algorithm control plan

provides a powerful tool to solve the planning problem with random parameters and predictive computing intelligent technology algorithm parameters.

### 3. The Basic Connotation of Precision Cultivation of Digital Multimedia Crop

With the intersection and integration of modern digital multimedia crop cultivation and emerging disciplines, digital multimedia crop cultivation management has been traditionally modeled and standardized. It is marching towards the direction of quantification and intelligence [7–9]. The application of system science and information technology to digital multimedia crop cultivation involves the digital design, monitoring, predictive computing intelligent technology, and management of objects and processes related to digital multimedia crop cultivation. The authors believe that the correct planting of digital multimedia crops is mainly to study the design and growth indicators of planting plans in digital multimedia crop cultivation. The intelligent monitoring, digital performance, and refined management of the information flow in the digital multimedia crop cultivation management system are realized through technologies such as quantitative key technology and application platforms (for example, production quality prediction and calculation intelligence technology) (Figure 1). Its foundation covers a wide range of disciplines such as agriculture, pedology, ecology and informatics, systematics, and management. Supporting technologies mainly include modern information perception, transmission, processing, and utilization technologies such as remote sensing monitoring, system simulation, decision support, and spatial information management. The research and development of the correct cultivation technology of digital multimedia crops aims at realizing the quantitative design of cultivation schemes, the intelligent technology of growth indicators, and the intelligent technology of dynamic prediction and calculation of yield and quality. The correct design of precise technology and accurate prediction of the three technological stages of computational intelligence technology (Figure 2) will help improve the planting model of the traditional digital multimedia crop. Due to the comprehensive influence of various factors such as climate, soil, and production conditions, the characteristics of weak temporal and spatial adaptability and low level of quantification have appeared, which has promoted the correct and scientific process of digital multimedia crop production management and improved the technical level and application ability of the development of digital multimedia crop cultivation.

### 4. Quantitative Design of Digital Multimedia Crop Cultivation Plan

*4.1. Technical Principles of Digital Multimedia Crop Cultivation Plan Design.* Through systematic analysis of concepts, comprehensive analysis of the regional and seasonal changes in the growth standards and planting skills of digital multimedia crops is adopted to analyze the

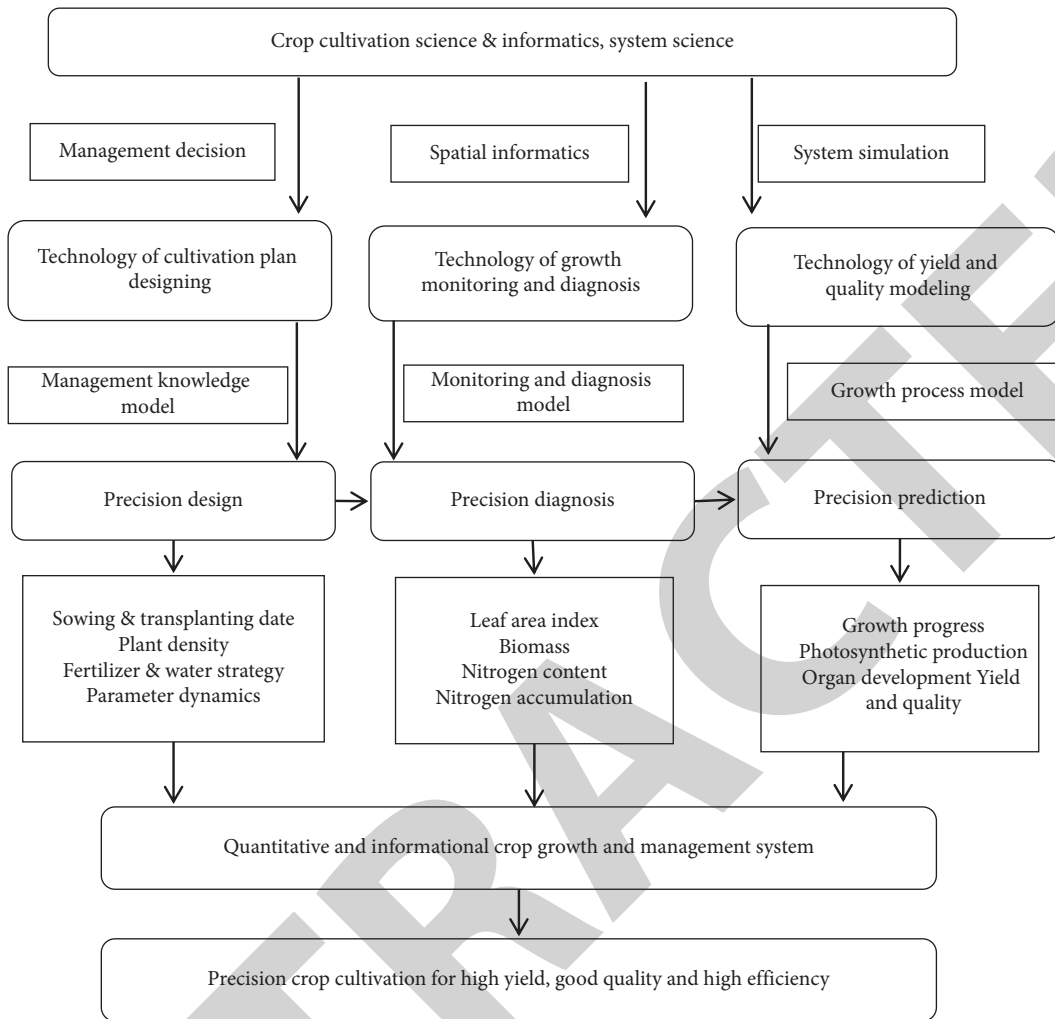


FIGURE 1: Frame diagram of the correct planting technology of digital multimedia crops.

interrelationship between the growth and productivity of digital multimedia crops and management, ecosystems, and production conditions [10–12]. The practical and intelligent digital multimedia crop management forms are established, which can be designed quantitatively based on the seeding management and growth technical indicators in different environments such as production environments. The model established based on the principle of production average yield and growth technology calculates the production target yield, appropriate seeds are selected by using gene types and suitable environments, and the germination/strong seedlings, regularity/heading of seeds, and other factors are observed to determine the planting time. The density of production and planting is figured out using the production output and the percentage of ear-bearing tillers, the principle of supply and demand balance is used to formulate the implementation of fertile water, and the growth and growth rate of intelligent technology are calculated through the planting plan. Meanwhile, good planting experience needs to be given to digital management, which will make up for the regional and empirical shortcomings of past cultivation

methods and expert systems. The output of digital multimedia crops (seed and production) is closely related to nitrogen factors. According to the concept of nutrient balance, the production and quality factors are used to establish a total nitrogen model for the production target through the nitrogen absorption standards of digital multimedia crops, soil characteristics, supply of nitrogen, and the quarterly use rate of nitrogen (Figure 3). Therefore, it is necessary to standardize the selection of appropriate varieties and the amount of nitrogen fertilizer for digital multimedia agricultural production in the ecological environment (Figure 4). The digital multimedia crop production management knowledge model is adopted for the calculation procedure.

4.2. *Development and Application of Design Technology of Digital Multimedia Crop Cultivation Plan.* Based on the construction concept of the components of the program, the calculation method of the digital multimedia crop management model is applied to computer hardware and software and the knowledge-based digital multimedia crop

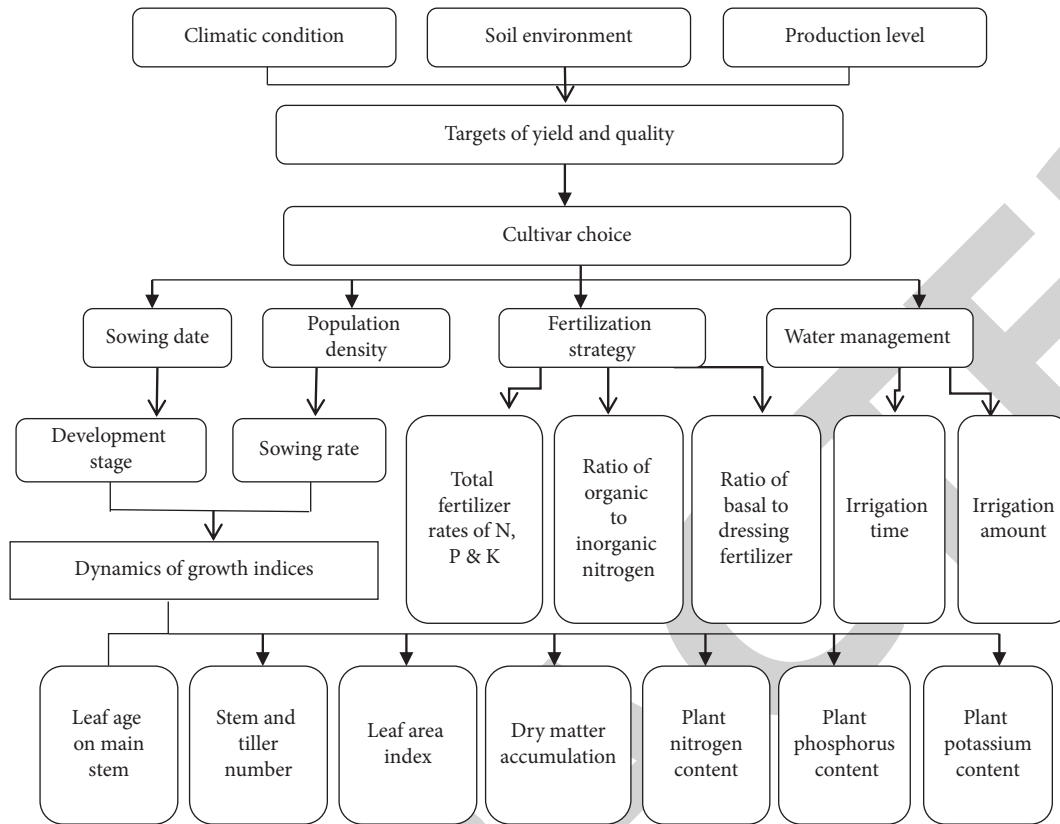


FIGURE 2: Overall structure diagram of the cereal digital multimedia crop management knowledge model.

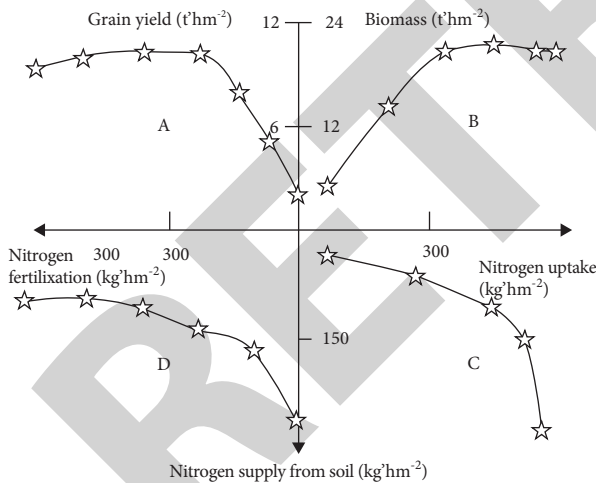


FIGURE 3: Digital multimedia crop yield and nitrogen absorption, soil nitrogen supply, and nitrogen facilities.

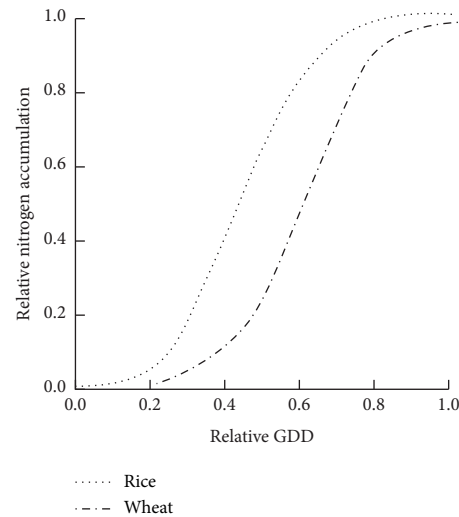


FIGURE 4: Dynamics of relative nitrogen accumulation in rice plants under high-yield conditions.

management support system and GIS technology are integrated together to develop a digital multimedia crop management support system on the model and GIS. Through environmental- and soil quality-related agricultural product information, management measures for the management and support of field planting to the geographical scope (that is, from the point to the surface) appropriate digital multimedia crop production management measures are provided. This technology can always

provide favorable conditions for the establishment of ecological classification and production classification model technology for the production conditions of crops and meanwhile carry out corresponding management techniques according to the needs [13, 14].

The abovementioned countermeasures give the implementation and feedback of digital multimedia crop planting strategies for different ecological environments,

time durations, sowing time durations, soil types, variety types, production volumes, quality standards, nutrients and water contents, and other issues. Through the analysis of actual results, this technical method can provide planting measures in different environments based on dynamic conditions and intelligence, giving appropriate results of decision-making ability and accuracy. It can be seen from Figure 5 that the planting model can be based on factors such as weather, soil quality, and varieties under the dynamic conditions of agricultural technology and experts. The growth environment and other factors affect the management techniques and growth standards, the real needs of growth management, and the growth of field wheat. In particular, the number of basic seedlings has been appropriately lowered, and the transportation costs of nitrogen, phosphorus, and potassium fertilizers have been reduced. Compared with the general area, the output of the experimental area has been significantly improved and the production income and the ecological system are better protected (increased production by 5%–15% and saved nitrogen by 10%–20%). It has played the practical and instructive role in the timely production of digital multimedia crops.

## 5. Prediction and Computational Intelligence Technology of the Digital Multimedia Crop Growth Indicator

*5.1. Technical Principles of Digital Multimedia Crop Growth Prediction and Computational Intelligence Technology.* Spectral monitoring and technology of digital multimedia crop growth indicators are based on the characteristic absorption, reflection, or transmission laws of different growth parameters of digital multimedia crops on different spectral bands. The characteristic spectrum information of digital multimedia crops can be obtained quickly and with zero defect by using sensors, and the growth indicator status of digital multimedia crops can be further analyzed and judged. The growth parameters of digital multimedia crops can be determined based on quantitative inversion and high-speed technology [15]. Through the implementation of digital multimedia crops under various conditions, units between fields and large-area experimental studies are performed, to obtain the spectral information of the coronal layer and leaves of digital multimedia crops with sensors. The mechanical rational relationship between the reflection spectrum characteristics and growth indicators of digital multimedia crops is explored, the core band and spectral parameters that are sensitive to each growth indicator are determined, and a quantitative inversion model of digital multimedia crop growth indicators is established. In addition, based on the coincidence between the real-time growth indicators of spectrum monitoring and the appropriate indicators of optimized design, the digital multimedia crop growth technology and fertilizer and water control models are established, for real-time monitoring of the digital multimedia crop growth to achieve intelligent technology and dynamic control. Figure 6 shows the feature of the

spectral reflectance of the wheat canopy under the different applied levels of nitrogen.

*5.2. Development and Application of Digital Multimedia Crop Growth Prediction and Computational Intelligence Technology.* The spectral analysis method is used to establish the nondestructive capture technology, technical control model, and practical device system of digital multimedia crop growth information based on the ground and space remote sensing platform, to realize the real-time technology and accurate adjustment of digital multimedia crop growth. First, the sensitive spectral bands and spectral parameters of the main digital multimedia crop growth indicators (leaf area indicator, biomass, leaf nitrogen, and leaf nitrogen storage) were extracted to establish a quantitative reversal model of digital multimedia crop production indicators based on the characteristics of the reflectance spectrum through a large number of experimental studies. The nitrogen prediction and calculation intelligent technology system of portable digital multimedia crop has carried out experimental modeling in the production of rice and wheat, and the results show that the technology can be converted from destructive sampling to nondestructive high-speed technology. Production management efficiency and nitrogen utilization efficiency have been increased, the growth observation method of digital multimedia crops has been innovative, and the rapid acquisition and intelligent technology of the potential information of digital multimedia crops has been realized. Just as the example of the rice experiment shows, the accumulation of nitrogen in the rice leaf in real time can be estimated and measured accurately by the technology and then dosage of additional fertilizer for the digital multimedia crops can be quantitatively estimated and recommended. For high-basic fertilizer treatments, the nitrogen content (high-nitrogen low-adjustment) is appropriately reduced, the nitrogen content for the medium-basic fertilizer treatments (medium-nitrogen fine-tuning) is optimized, and the nitrogen content is increased for the low-basic fertilizer treatments (low-nitrogen high-adjustment). After technical control, the production is increased by 10.8% and 5.4%, respectively, by the low-nitrogen harmonic wave and medium-nitrogen fine-adjustment treatments. The high-nitrogen and low-adjustment treatments were the same as the comparative yield, but the amount of nitrogen fertilizer used was reduced by 28.6% (Figure 7). Meanwhile, the agronomic utilization rate of nitrogen fertilizers with limited treatment has been significantly improved.

## 6. The Intelligent Technology of Simulation, Prediction, and Calculation for Digital Multimedia Crop Productivity

*6.1. Technical Principles of Digital Multimedia Crop Productivity Prediction and Computational Intelligence Technology.* Through the simulation of the growth cycle, interrelationship between the growth process of the growth and yield of digital multimedia crops, the growth environment, the management mechanism, and the variety is

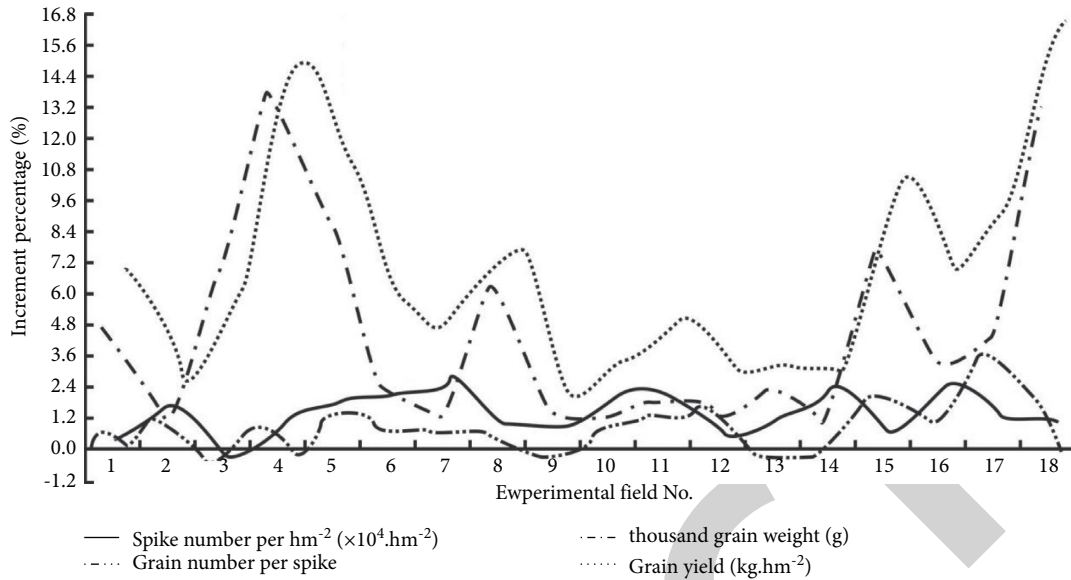


FIGURE 5: Wheat management decision support system shows the increased rate of output and output structure in the comparison area of Rugao.

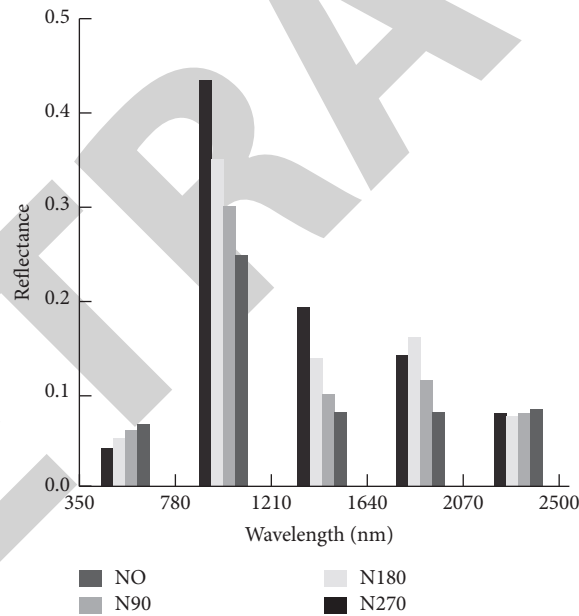


FIGURE 6: Wheat canopy spectral reflectance characteristics under different nitrogen levels.

analyzed. In the context of digital prediction computational technology, a model for the growth and yield comparison of digital multimedia crops has been established, which can complete the calculation of the growth dynamics and yield of digital multimedia crops under different backgrounds. First, based on the background of the growth period of digital multimedia crops, the relationship between the environment, soil quality, management technology, and growth cycle of digital multimedia crops can be integrated. Powerful conditions are provided for the establishment of a digital multimedia farming growth cycle system model. This model can

reflect the growth cycle, productivity, and quality of digital multimedia crops under different environments based on the influence of environment, soil texture, variety characteristics, and management techniques. Therefore, under different backgrounds and growth environments, it can bring powerful tools for the establishment of digital multimedia farming varieties and management techniques. For example, rice goes through four growth processes from seedling to maturity, basic nutrition, lighting, ear formation, and seed filling, and therefore, the yield of rice is also related to daily light, weather, and the nature of the variety. The interaction between the



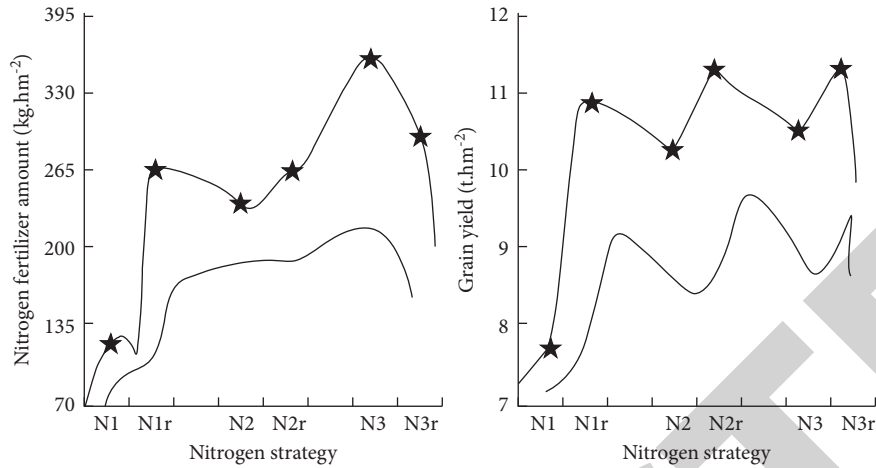


FIGURE 7: Total nitrogen application rate and seed yield of rice with different nitrogen fertilizers.

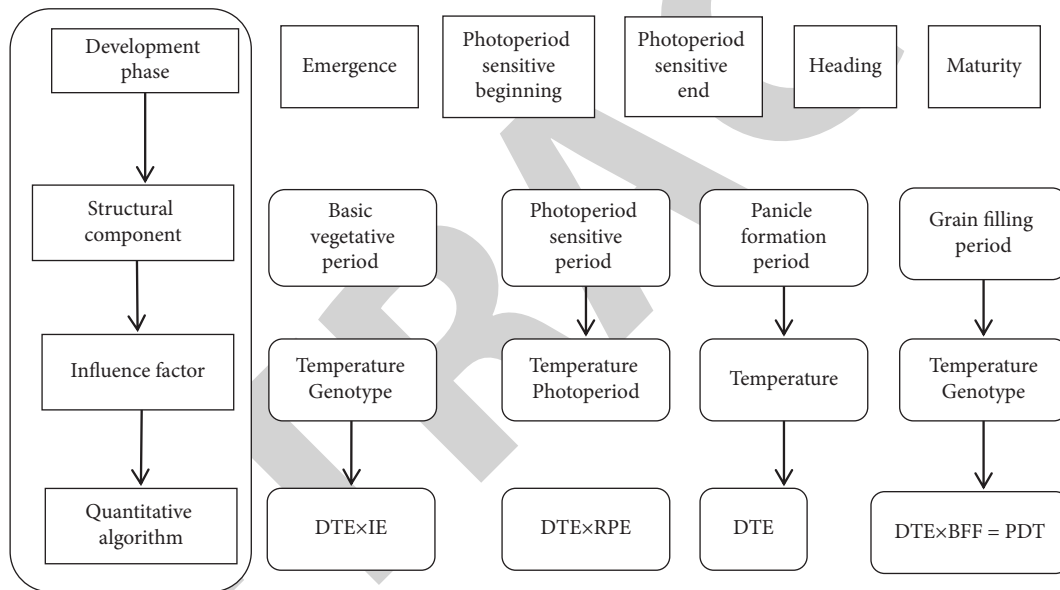


FIGURE 8: Structure framework of the submodel of the rice growth period.

irrigation cycle before or after the ear formation of rice and the conditions after ear formation plays a decisive role in the size of the rice's growth results and the daily growth time. Through the daily cumulative growth cycle as the size of the rice growth period, a model for predicting the stage growth and yield cycle of rice is established (see Figure 8).

6.2. Development and Application of Digital Multimedia Crop Productivity Prediction and Computational Intelligence Technology. Based on the physiological and ecological process model of digital multimedia crops, combined with the meteorological data generation model and the variety parameter adjustment model, it is suitable for object-oriented programming technology. Integration can build a digital multimedia crop growth and productivity simulation system with powerful machine rationality and predictive computational intelligence technology, quantitatively

predicting and computing the different ecological conditions of computing intelligence technology. The formation process of digital multimedia crop growth indicators and yield quality under the conditions of varieties and planting measures (Figure 9). Further combining spatial information technology, scenario analysis methods, strategic evaluation models, etc., a componentized digital multimedia crop growth simulation and management decision support system with strong universality and operability can be established, and the reliable predictive computing intelligence technology can be obtained for digital multimedia crop growth dynamics and productivity indicators under different environments, technologies, and varieties. The evaluation and decision support of intelligent technology are realized for digital multimedia crop productivity prediction calculations at different time and space scales, and platforms and tools are provided for the breed improvement target of digital multimedia crop, technical control channels, and



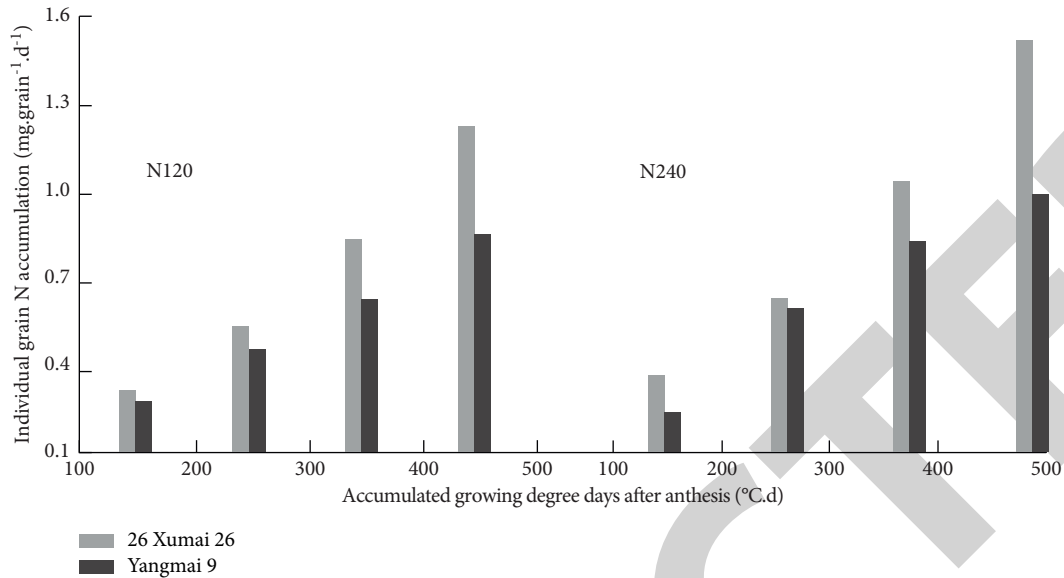


FIGURE 9: Simulation of protein accumulation rate of wheat seeds with different nitrogen contents.

quantitative analysis of environmental countermeasures under dissimilar conditions, such as assessing the comprehensive impact of climate change on the growth of digital multimedia crops and countermeasures.

## 7. Conclusions

Agriculture is one of the important industries in China, and it plays an important role in China's economic development. Therefore, accurate seeding can be carried out according to the characteristics of the peasants' land, to increase the productivity of the farmers and bring higher profits to the peasants. Meanwhile, farmers adopt correct planting methods to increase agricultural output, so that China's agricultural productivity can be further improved. Scientific and reasonable planting and management measures are carried out for agriculture, which require large amounts of data and technology and also need a lot of time on the formulation, modification, follow-up, and improvement of strategies. The future work will orientate at a large amount of data collection and production forecasting.

## Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

## Conflicts of Interest

The authors declare no conflicts of interest.

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